Oxytocin is an age-specific circulating hormone that is necessary for muscle maintenance and regeneration.

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Public Summary:
This work uncovers a new way to enhance regeneration of aged tissues by already FDA approved molecule, oxytocin.

Scientific Abstract:
The regenerative capacity of skeletal muscle declines with age. Previous studies suggest that this process can be reversed by exposure to young circulation; however, systemic age-specific factors responsible for this phenomenon are largely unknown. Here we report that oxytocin--a hormone best known for its role in lactation, parturition and social behaviours--is required for proper muscle tissue regeneration and homeostasis, and that plasma levels of oxytocin decline with age. Inhibition of oxytocin signalling in young animals reduces muscle regeneration, whereas systemic administration of oxytocin rapidly improves muscle regeneration by enhancing aged muscle stem cell activation/proliferation through activation of the MAPK/ERK signalling pathway. We further show that the genetic lack of oxytocin does not cause a developmental defect in muscle but instead leads to premature sarcopenia. Considering that oxytocin is an FDA-approved drug, this work reveals a potential novel and safe way to combat or prevent skeletal muscle ageing.